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ABSTRACT

Advocates of inexpensive publishing confront a widespread complaint that there is already an overproduction of scholarship that electronic publishing will make worse. The costs of electronic publishing correlate to a clutch of choices: speeds of access, breadth and depth of content, visibility, flexibility, durability, dependability, definition of community, differentiation, and ease of use. Three disadvantages of electronic publishing in terms of expenditures include: (1) new costs to preparation of the first copy; (2) savings enjoyed by the publisher are made possible only if the end user has also invested a large sum in making it possible to receive the publication; and (3) both the scholarly publisher and the end-user alike are dependent on even greater costs being born by universities and their libraries. The fundamental costs of a university infrastructure are enormous. Publishers are cautiously optimistic that electronic marketing will prove more advantageous than bulk mail, and it will certainly be cheaper. As electronic publishing increases its pressure on hiring, evaluation, tenure, and promotion, the certification and prestige functions of publishers will increasingly depend on their attention to the emerging criteria of electronic publishing, in which costs are measured against benefits that print could never offer. (AEF)

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Session #1 Economics of Electronic Publishing: Cost Issues

Epic: Electronic Publishing is Cheaper

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Some time ago the phrase "Electronic publishing is cheaper than print" was promoted from a hope into a credo, taken seriously from Disneyland to Atlanta. "Electronic publishing is cheaper than print" has recently been repeated as often and as faithfully as a mantra but it now looks more and more like a conditional conclusion. It is possible that electronic publishing will eventually be cheaper than print, and it already certain that some types of electronic publishing are cheaper than other types.

In its quest for quality, scholarship likes things that are cheap, loves things that are fast and easy, and worships things that last. The questions nagging us now are how big can media packages get, how long can they last, what impact will they have, who decides, and at what cost. Advocates of inexpensive electronic publishing confront a widespread complaint that there is already an overproduction of scholarship that electronic publishing will make worse. The costs of electronic publishing correlate to a clutch of choices: speeds of access, breadth and

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depth of content, visibility, flexibility, durability, dependability, definition of community, differentiation, and ease of use. In such a field of choices, there is not a basic cost, or an optimum one, or an upper limit. If cost were no object, the Aeneid would be carved on mountainsides.

Comparative costs guide many crucial decisions in the queasy shift from paper to ether, not only the reproduction costs of print and digitalization, but also the costs of fulfillment, revision, and protection.[1] For the time being, most mainstream digital publications remain dependent on print, either as a publication of record, as with most scholarly journals, or as a center around which electronic sites orbit, as with the Web sites for WIRED, numerous newspapers and magazines, publishers of all stripes, book clubs, and book sellers. In this parallel-publishing environment, print costs remain in place, while the costs of mounting and maintaining a digital presence are added on.

For strategic reasons some publishers have established Web sites with little expectation of recovering those added costs. Washington Times, for example, felt it was necessary to mount a Web site in order to protect its identity as the primary guide to entertainment and restaurants in the nation's capital. The Times cannot risk a rival on the Web that might get a toehold in the market. Similarly, publishers large and small set up Web sites defensively, to maintain an up-to-date profile, to market directly to customers, and to be sure that when and if the Web market matures, they will be ready to compete for it. In the meantime, electronic publishing offers no savings; to the contrary, it requires extra costs that must be recovered somehow. Because these costs are considerable, so is the extra burden on recovery.

The Net is with us and few are so myopic as to think it will go away. But lurking in every discussion of electronic costs is the prospect that print will go away, at least for some forms of publishing. Because on-line publishing vaunts its capability for transferring information speedily, on-line publishers emphasize publishing as nothing else than information transfer. But publishing is not merely the transfer of information: it confers prestige, it competes for attention, it defines a group to itself, sometimes with explicit membership. John Seeley Brown, Director of Research for Xerox, has stressed this community-building function as essential to our comprehension of publishing value.[2] Anyone on a listserve knows that electronic publishing is prone to invasion. The Web exposes a value in print publication that was previously taken for granted: peace.

For a publisher, the costs of electronic publishing can be best understood in the standard publishing sequence: the costs of acquisition, the costs of editing, the costs of the preparation of the first copy, the costs of mass reproduction, the costs of distribution, and the costs of administration. The manufacturing cost of a typical print journal in the humanities consumes about 50% of the journal's operating budget, and shipping and warehousing can eat up another 10%; to a cybershark these percentages look like chunks of fat removable in big bites. Those who confidently declare that electronic publishing is cheaper than print focus chiefly on perceived savings in reproduction and distribution, on the premise that once the first copy is prepared its reproduction and transmission circumvent the costs of printing, paper, ink, packaging, shipping, spoilage, and inventory.

This premise is the pot of gold we all pursue, but experience has shown that there are at least three holes in its rainbow. First, electronic publishing adds numerous new costs to preparation of the first copy. Second, the savings enjoyed by the publisher are made possible only if the end user, whether a library or an individual, has also invested a hefty sum in making it possible to receive the publication. And third, both the scholarly publisher and the end-user alike

are dependent upon even greater costs being born by universities and their libraries.

As costs became gradually more predictable for Project Muse, Marie Hansen calculated that the additional costs for preparing parallel print and electronic journals is about 130% of the cost of print only. Even if print versions were dropped, the costs to produce the first copy ready for mounting on a server would be as high as 90% of the cost of a paper journal.[3] The cost savings for printing, storage, shipping, and spoilage are substantial, but in the digital realm they are replaced by new costs: system administration, content cataloging, tagging, translating codes, checking them, inserting links, checking them, network charges, computer and peripherals charges, and additional customer service.

In the near term there are also high costs for acquisitions. It has taken longer than expected to negotiate contracts with journal sponsors, to obtain permissions, and to acclimate journal editors to the steps required for realizing the efficiencies of the digital environment. Electronic editors play fast and loose with copyright, always waving the banner of "fair use" while blithely removing copyright notices from texts and images. Piracy is not only a foreign problem: it occurs everyday in name of freedom. Explaining to electronic editors why copyright is in their best interests, and thus worthy of observance, has been just one time-consuming task. As Project Muse enters its third year, we see more clearly the costs of rearing an infant.

The Supra of the Infra

The fundamental costs of a university infrastructure are enormous. The Homewood campus at Hopkins is home to 5200 students, faculty, and staff who want connections to the Net. The start-up costs for rewiring the campus to UTP--at a rate of about $150 per connection--would have been impossibly high for the University if not for $1 million in help from the Pew Trust. According to Bill Winn, the Associate Director for Academic Computing at the Homewood campus of Hopkins, it costs $20 per month for each person to connect to the campus network. The network itself costs $1 million per year to maintain, and an additional $200,000 to support PPP (point-to-point protocol) connections. The annual bill to provide Net access to the 900 students who live off-campus is $200,000. The fee to the campus's Internet Service Provider for a 4-megabit-per-second Net-link, plus maintenance and management, costs the University about $50,000 per year.

Students, he says, require high maintenance: if their connections are insecure, it's often because they've been ripped from the wall. Last year students in engineering attempted to install a software upgrade for a switch that exceeded their wildest dreams: it shut down the University's system for more than a week. If you're counting, that adds up to about $20,000 of lost Net access, not to mention the costs of repair.

In 1996, Johns Hopkins University budgeted $70,000 for hardware maintenance and $175,000 for hardware upgrades, chiefly to handle rapidly increasing traffic. The million-dollar budget supports a staff of three technicians, an engineer, a software analyst, and a director for networking who are so busy handling day-to-day problems and requests that it is clear to most people on campus that additional staff is needed. Their overhead is kept to a minimum, since some key people are based in a trailer parked below the Milton Eisenhower Library.

Bill Winn believes that the $20-per-month access charge is comparable to other campuses elsewhere in the United States, a useful point of departure for all other cost estimates. When it

costs $240 a year per person to link a computer to the Net, the University's administration confronts a cost chasm. This is $240 that cannot be spent on something else. And this is only a chip of the iceberg: each department bears most of the costs for its own infrastructure, at costs unexpected in the days of typewriters and paper memos.

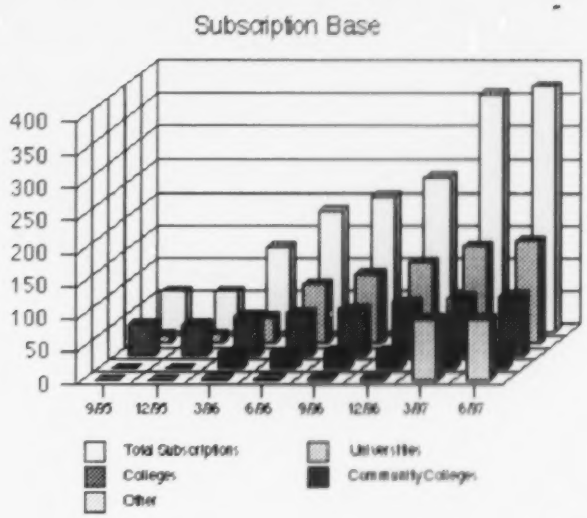
Further, in order to make this initial investment worthwhile, more expensive investments must continue to be made: upgrades, peripherals, database access fees, consultants, and specialized software. It is no wonder that the virtual bloom has fled the virtual rose for many colleges, who have second thoughts about their level of commitment to Net access. To some extent, electronic publishers are still stymied by the lag between the Net's ability to produce and its readers' ability to receive. That lag bears a price tag, and some institutions cannot or will not pay, most state governments cannot pick up the bill, and the federal government is increasingly reluctant to reserve space or investment for scholarly networking.

Optimum Optimism

Every sidewalk philosopher has speculated whether electronic publishing will exacerbate monopolies and class divisions, or whether a slow, steady spread of access will lower costs and lead to greater democratization. The Net is full of threads on the inconsistent costs of Net access from place to place.[4] Depending on my morning caffeine intake, I am more or less optimistic about the liberating prospects offered by the Net for our era. It may be that computers will be as ubiquitous as TVs and a Net connection as cheap as a telephone.[5] But for now, when I focus on the role of the Net in higher education, I usually see higher costs, and foresee only more and more differentiation based upon costs and the ability to recover them. What must not be lost in these sober comparisons is that the conversion from print to pixels is not merely a change of clothes: it is an enormous expansion of capability.

Added costs purchase substantial added value. Under the domain plan that Muse, Jstor, Artfl, and other experiments are refining, we have already accomplished no less than seven olympic leaps in scholarly transmission. Here is the hallowed litany: (1) instead of a library maintaining one copy of a work that can be read by one person at one time, the work can now be read by an entire campus simultaneously; (2) instead of having to search for a location and hope that a work is not checked out or misshelved, a user can find the full text at the instant it is identified; (3) the work can be read in the context of a large and extensible congregation of journals, including back issues, each as easily accessible as the first; (4) the work is capable of being transformed without disturbing an original copy; pages can be copied without being ripped out; students can make copies without complaining that the photocopier is jammed or out of toner; (5) the work can be electronically searched; (6) there is no worry about misplacing the work or returning it by a due date; and (7) the increase in costs, if honestly reflected by a corresponding increase in price, permit libraries to spend a little more to be able to offer a lot more content, expanding their holdings geometrically while increasing their costs arithmetically. This is not just pie in the sky: our readers are reaping real fruit. Project Muse has already attracted 100 library subscribers who previously subscribed to none of our print journals, including libraries in museums and community colleges. (See Graph 1.)

Graph 1



Even if some claims for the digital revolution are ridiculously inflated, its agents can confidently claim that the revolution has occurred with unprecedented self-consciousness and organizational care. That care deserves a few choruses of praise. I am thankful for the assistance of commercial presses for their support for standardization, their defense of copyright, their vigilance against piracy, and their scrutiny of current and pending legislation. I am thankful for the frank and frequent discussions between publishers and librarians. Conversations with Jim Neal often remind me of a home truth: libraries are the original multimedium. For multiple reasons librarians' reactions to the systemic costs of digitalization are immediately relevant to publishing decisions. I am thankful for the support of the Mellon Foundation. Its key role in the development of digital scholarly communication has not only saved universities delay, risk, and anxiety, but has put the universities where they can do the most good: out in front, experimenting, thinking things through. If not for the Mellon Foundation and its projects the growth of the Net would shuttle between large corporations and isolated individuals, with maddening secrecy and without much interest in the special needs of scholarship and the special costs it encumbers. Efforts to create a cheaper and more attractive home for STM studies would have stuck to the starting blocks. Libraries would be asked to acquire extraordinarily expensive databases without a clue about the relationship between price and actual costs. If the digital revolution is a revolution rather than a colossal marketing scheme, it is because so many people and institutions are involved and invested.

For Muse the greatest cost is for personnel. For decades, it has been possible to maintain a journals program staffed by literate and dedicated people; Muse employees also have to well beyond computer literacy and masters of complex skills. To raise Muse from infancy, they must also be virtually parental -- creative, patient, resourceful, and endowed with heroic stamina. Because their jobs require higher and higher levels of education and technical skill, starting positions are more expensive. Disregarding administrative costs, the staff of Muse cost about 20% more per capita per month than the staff of print journals.

We are just beginning to understand the costs of hiring, training, and retaining qualified staff. Because the skills of the Project Muse team are pioneering, those who succeed are much in demand, and are subject to recruitment raiding for still higher salaries. Due to the inordinate

pressures put upon them--not only the stress of the grant schedule, the frustrations of downtime, and the frictions of incompatible programming--but also their anxiety about their futures and the very real resentment projected by the staff in print journals, these young people may grow old at a rate faster than Bill Gates can update software. The next time a rosy-cheeked cherub cheerfully announces the death of print, let him look into the bloodshot eyes of the Muse staff. What seemed to be freshness and precocity a couple of years ago now shows signs of premature burn out.

Excluding independent contractor costs, personnel costs account for 46% of the start-up and maintenance costs for Project Muse. Including independent contractor costs, which are themselves chiefly a matter of personnel, that percentage rises to 59%.

Second only to personnel, the largest expense has been hardware, accounting for 12% of total costs.[6] Third is rent, at 3.3%. Fourth, surprisingly, has been travel, requiring 2.9% of investment. The travel budget is a direct reflection of the extensive need to negotiate on every frontier: with the learned societies and editorial boards that run the journals, with the librarians who buy them, and with editors who want to move their journals to Muse. In the first two years of Muse's development, our efforts to build Muse were distracted by the novelties of the Net--training staff, dealing with journal sponsors, conversing with libraries--each a task as vital as the selection of software or the conversion of codes. Marketing was kept to a minimum until we had a complete package to deliver. With the completion of the forty-journal base last December, we are now in high gear marketing Muse, so marketing expenses will begin to affect all percentages. Travel and exhibits will have still higher costs as we strive to attract a subscription base strong enough to make Muse self-supporting.

The Electronic Market

Marketing on the Web is a different creature than marketing via print or radio, because it must contend both with misinformation and with the difficulty of finding an audience. Misinformation about an electronic site shows up in the same search that finds the site itself and may require quick response. Muse responds readily enough to the Net's search engines, but only if the person is searching. Even then, the searcher can only read text if the searcher's library has already subscribed. At the December 1996 Modern Language Association exhibit, about half of the persons who expressed their wish that they could subscribe to Muse belonged to universities that already did, but the scholars didn't know it. With usage data looming as a subscription criterion, we will cannot rest after a subscription is sold; we still have to reach the end user.

The marketplace itself is changing. Most conspicuously, the unexpected formation of library consortia has reshaped many a business plan. Expectations of library sales have often hung fire while libraries consorted, but in the long run it is likely that by stimulating these consortia, electronic publishing will have served an important catalytic function for discovering and implementing many kinds of efficiencies.

The Net Market is enormous and enormously fragmented.[7] In the next year there will be numerous marketing experiments on the Web. New and improved tools emerge every month that will help us reply to scholars with specific requests, complaints, and inquiries. Publishers are cautiously optimistic that electronic marketing will prove more advantageous than bulk mail, and it will certainly be cheaper. Already most university presses have their catalogs on line and many are establishing on-line ordering services.

Customer service is another high cost--at present, much higher than for print journals. Today it takes one customer service agent to attend to 400 Project Muse subscriptions, while a customer service agent for print journals manages about 10,000 subscriptions. But the future offers bright hope. In February, our customer service agent for Project Muse sent an e-mail message to 39 past-due subscribers to Muse who were not with a consortium. Within 24 hours of sending this letter, she received 29 responses to it, and four more arrived the next day. Each thanked her for sending the letter, and all 33 renewed for 1997. Here the advantages of on-line communication are obvious and immediate.

There are also costs that are difficult or impossible to track or quantify, like intellectual costs. It is these costs that have emerged as the next vexed problem in the development of electronic scholarly resources. The problem has three prongs.

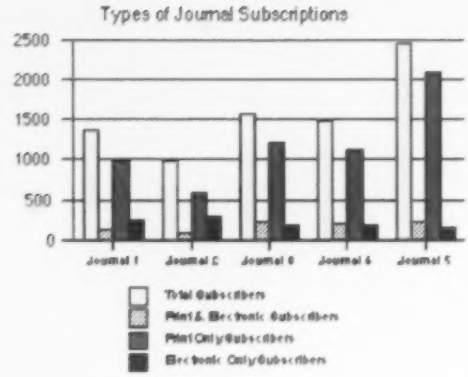
One is scholarly skepticism about the value of electronic publishing for tenure and promotion.

Another is the fluidity of the Web, which for all its nautical metaphors often seems a murky flood. Journal editors are anxious about the futures of their journals and hesitant about entrusting them to a medium as fleeting as electricity. Well aware of past losses, scholarship generally prefers the medium most likely to last. This preference is firmly based: some ideas take time to hatch, some messages take years to sprout, and the gush and backwash of the Web seem unstable or engulfing. Scholars care that their work endures; that it is a heritage; that if they care for it well it will live longer than they do. Scholars who know and use the Net often encounter defunct URLs, obsolete references, wretched writing, Web sites that bloomed like gardenias and softened into mulch, and mistakes of every kind. Ephemerae appear more ephemeral on screen. Chief among the concerns expressed by librarians interested in purchasing electronic publications is whether the publication is likely to be around next year and the year after.

The third prong is the sharpest: will electronic publishing be able to recover the operating costs of scholarship, the costs of editing, of maintaining a membership, and of defending a niche in the pantheon? If journals are to migrate to electronic formats, they will have to be able to survive there, and survive the transition, too: the current competition is part endurance, part sprint. Since parallel publishing in print and on line costs more, library budgets will either have to pay more to sustain dual-format journals, or cut them, or cut other journals to support them.

In the short term, at least, there is reassurance in numbers. Rather than erode reader and subscription base, electronic versions of journals actually increase them. (See graph 2). Even if paper subscriptions dwindle, it appears that the increase in subscriptions and readership will last. Of course, means for cost recovery for each journal must also last, which is why different publishers are trying different pricing strategies.

Graph 2



Competition in the electronic environment is expensive and aggressive (a favorite book for Netizens is Sun Tzu's Art of War).[8] Foundation assistance can enable university presses and libraries to enter the competition, but it is uncertain whether their efforts can compete for very long when foundation support ends. Scholarship has deep reservoirs of learning and good will, but next to no savings; one bad year could wipe out a hundred-year-old journal. Unless journal publishers and editors can migrate quickly and establish a system to recover costs successfully, the razzle-dazzle of paper-thin monitors will cover a casualty list as thick as a tomb.

This risk has shifted attention from the costs of production and distribution to the costs of acquisition. Publishers and their partners are trying to determine what costs must be paid to attract scholars to contribute to their sites. It is obvious that a moment after a scholar has completed a work, a few more keystrokes can put the work on the Web without bothering a publisher, librarian, faculty committee, or foundation officer. Indeed, electronic publishing is cheaper than print, if you rule out development, refereeing, editing, design, coding, updating, marketing, accounting, and interlinking. Further, there are numerous scholars who believe they should be well paid for their scholarship or their editing. Stipends paid by commercial publishers have raised their editors' financial expectations, which in turn exacerbated the current crisis in STM journals. Retention of such stipends will devour savings otherwise achieved by digitalization.

What is now at issue is what each added value is worth. Competitive programs are now testing the academic market to see how much it wants and how much it will pay, whether page images are preferable to HTML, whether pricing should sequester electronic versions or bundle them into to an omnibus price, what degree of cataloging and linking and tagging are desired, what screen features make sense, and a realm of other differentia, not least of which is the filtering of the true from the spew. We expect to see significant differences between the costs and prices of scientific and humanities journals, and with our library partners scrutinizing real usage and comparative costs, we expect these differences will be less and less defensible. And we expect to see gradual but salutary changes in scholarship itself as different disciplines come to terms with the high visibility of electronic media. Ballooning literature surveys, for instance, are prime candidates for reform. We expect to see a clearer separation of reputation, with all that a reputation is worth, as professionally managed electronic media distance their offerings from the Web sites of hobbyists, amateurs, and cranks. Finally, we expect to see shifts in academic collaboration and shifts within disciplines. As electronic publishing increases its

pressure on hiring, evaluation, tenure, and promotion, the certification and prestige functions of publishers will increasingly depend on their attention to the emerging criteria of e-publishing, in which costs are measured against benefits that print could never offer.

NOTES:

1. Piracy is a real threat. According to the Software Publishers Association, about $13 billion in sales was lost due to piracy in 1996. See the SPA homepage against piracy: http://www.spa.org/piracy/homepage.htm.

2. See John Seely Brown and Paul Duguid, "The Social Life of Documents," Release 1.0, October 1995. See http://www.edventure.com/release1/abstracts/9510.html.

3. Marie Hansen, "Pricing Issues for Electronic Journals," unpublished.

4. For example, http://www2.iphil.net/ph-isp/1995-_Dec/0393.html.

5. An article in Upside forecast that Internet customer services could save businesses 25% to 50% of the cost of traditional telephonic customer support. David Kline, "Reshaping the way America Does Business," Upside Online, August 5,1996.

6. For hardware specifications for each member of the Project Muse staff, see: http://calliope.jhu.edu/poj-descrip/tech_specs.html.

7. There is also enormous disagreement about how enormous it is. Recent estimates vary between 5.8 million and 35 million users. See http://www.cyberatlas.com/market.html.

8. See, for instance: http://www.pic.net/%7Ewlevinso/sun_tzu.html; http://www.geocities.com/Athens/4884/; and http://www.kimsoft.com/polwar.htm.

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